SAFETY DATA SHEET

According to OSHA Hazcom Standard 29 CFR 1910.1200

Anhydrous Industrial Ethanol(AIE)

1. IDENTIFICATION

A. Product name

- Anhydrous Industrial Ethanol(AIE)

B. Recommended use and restriction on use

- General use: Adhesives, sealants, Anti-Freeze and de-icing products, Washing and cleaning products, Metal surface treatment products (Electroplating agents), (Flame retardants and Fire preventing agents), Fuels and additives, Feed materials, Intermediates, Laboratory chemicals, Solvent and extraction agents, Stabilizers, Viscosity adjusters, Cosmetics, personal care products, Perfumes, fragrances, Pharmaceuticals, Fertilizers, Air care products, Biocidal products, Others
- Restriction on use: Do not use any other purpose

C. Manufacturer / Supplier / Distributor information

○ **Manufacturer information**

- Company name: Korea Alcohol Industrial Co., LTD.
- Address: (Headquater) 14, Tapsil-ro 35beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Korea
  (Ulsan office) 66, Sanggae-ro, Nam-gu, Ulsan, Korea
- Emergency telephone number: (Headquater)(+82)31-881-8100, (Ulsan office)(+82)52-259-4761~2

○ **Supplier/Distributor information**

- Company name: Korea Alcohol Industrial Co., LTD.
- Address: (Headquater) 14, Tapsil-ro 35beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Korea
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2. HAZARD IDENTIFICATION

A. GHS Classification

- Flammable liquids : Category2
- Serious eye damage/irritation : Category2

B. GHS label elements

○ **Hazard symbols**



○ **Signal words**

- Danger

○ **Hazard statements**

- H225 Highly flammable liquid and vapour
- H319 Causes serious eye irritation

○ **Precautionary statements**

1) Prevention

- P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- P233 Keep container tightly closed.
- P240 Ground and bond container and receiving equipment.

- P241 Use explosion-proof electrical/ventilating/lighting/equipment.
- P242 Use non-sparking tools.
- P243 Take action to prevent static discharges.
- P264 Wash hands thoroughly after handling.
- P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

2) Response

- P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P337+P313 If eye irritation persists: Get medical advice/attention.
- P370+P378 In case of fire: Use Suitable extinguishing media for extinction(Refer Section SDS 5).

3) Storage

- P403+P235 Store in a well-ventilated place. Keep cool.

4) Disposal

- P501 Dispose of contents/container in accordance with local/regional/national/international regulation

C. Other hazards which do not result in classification

- Not available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Trade names and Synonyms	CAS No.	Content(%)
Ethanol	Alcohol anhydrous ; Alcohol dehydrated ; Ethyl alcohol ; Ethanol solution ; Alcohol ; Fermentation alcohol ; Algrain ; Ethyl hydrate ; Ethyl hydroxide	64-17-5	99.9≤
Methanol ; Methyl alcohol*	Wood alcohol ; Methyl alcohol ; Monohydroxymethane ; Methyl hydroxide ; Methyl hydrate ; Methyl hydrid ; Wood naphtha ;	67-56-1	<0.1
2-Propanol*	Isopropanol ; Dimethylcarbinol ; Isopropyl alcohol ; n-Propan-2-ol ; Propan-2-ol ; i-Propyl alcohol ; 2-Propanol	67-63-0	<0.1
1-Propanol*	n-Propanol ; Propan-1-ol ; Ethyl carbinol ; 1-Hydroxypropane ; N-Propyl alcohol ; 1-Propyl alcohol ; Propylic alcohol ; Propanol-1 ;	71-23-8	<0.1
Acetaldehyde; Ethanal*	Acetic aldehyde ; Ethanal ; Ethyl aldehyde ; Acetehyde ; Acetaldehyde ; Acetylhydride ; Aldehyde ;	75-07-0	<0.1
1,1-Diethoxyethane*	Acetaldehyde,diethyl acetal (8CI)	105-57-7	<0.1
N-[2-(2,6-Dimethylphenyl)amino]-2-oxoethyl]-N,N-diethylbenzenemethanaminium benzoate*	DENATONIUM BENZOATE	3734-33-6	<0.1
Water*	Aqua; Dihydrogen oxide	7732-18-5	<0.1

4. FIRST AID MEASURES

A. Eye contact

- Do not rub your eyes.
- Immediately flush eyes with plenty of water for at least 15 minutes and call a doctor/physician.
- Go to the hospital immediately if symptoms(flare, irritate) occur.

- Remove contact lenses if worn.

B. Skin contact

- Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- Wash contaminated clothing thoroughly before re-using.

C. Inhalation contact

- Take specific treatment if needed.
- When exposed to large amounts of steam and mist, move to fresh air.

D. Ingestion contact

- Please be advised by doctor whether induction of vomit is demanded or not.
- Rinse your mouth with water immediately.

E. Delayed and immediate effects and also chronic effects from short and long term exposure

- Not available

F. Notes to physician

- Notify medical personnel of contaminated situations and have them take appropriate protective measures.

5. FIREFIGHTING MEASURES

A. Suitable (Unsuitable) extinguishing media

- Avoid use of water jet for extinguishing
- Dry chemical, carbon dioxide, regular foam extinguishing agent, water spray

B. Specific hazards arising from the chemical

- Causes serious eye irritation
- Highly flammable liquid and vapour

C. Special protective actions for firefighters

- Avoid inhalation of materials or combustion by-products.
- Cool containers with water until well after fire is out.
- Do not approach the tank surrounded by fire until it is extinguished.
- In case of conflagration, use automatic fire sprinkler. Major fire may require withdrawal, allowing the object itself to burn.
- Keep unauthorized personnel out.

6. ACCIDENTAL RELEASE MEASURES

A. Personal precautions, protective equipment and emergency procedures

- Do not touch spilled material. Stop leak if you can do it without risk.
- Handle the damaged containers or spilled material after wearing appropriate protective equipment
- Move container to safe area from the leak area.
- Must work against the wind, let the upwind people to evacuate.
- Remove all sources of ignition.

B. Environmental precautions

- If large amounts have been spilled, inform the relevant authorities.
- Prevent runoff and contact with waterways, drains or sewers.

C. Methods and materials for containment and cleaning up

- Appropriate container for disposal of spilled material collected.
- Dike for later disposal.

- Disposal of waste shall be in compliance with the Wastes Control Act
- Large spill : Stay upwind and keep out of low areas. Dike for later disposal.
- Notify the central and local government if the emission reach the standard threshold.

7. HANDLING AND STORAGE

A. Precautions for safe handling

- Avoid contact with incompatible materials.
- Avoid direct physical contact.
- Comply with all applicable laws and regulations for handling
- Dealing only with a well-ventilated place.
- Do not handle until all safety precautions have been read and understood.

B. Conditions for safe storage, including any incompatibilities

- Avoid direct sunlight.
- Check regularly for leaks.
- Do not apply any physical shock to container.
- Do not apply direct heat.
- Do not use damaged containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

A. Exposure limits

○ **ACGIH TLV**

- [Ethanol] : STEL 1000 ppm URT irr
- [Methanol ; Methyl alcohol] : TWA 200 ppm STEL 250 ppm
- [2-Propanol] : TWA 200 ppm STEL 400 ppm
- [1-Propanol] : TWA 100 ppm Eye & URT irr
- [Acetaldehyde; Ethanal] : STEL C 25 ppm Eye & URT irr

○ **OSHA PEL**

- [Ethanol] : 1000 ppm, 1900 mg/m3
- [Methanol ; Methyl alcohol] : 200 ppm, 260 mg/m3
- [2-Propanol] : 400 ppm, 980 mg/m3
- [1-Propanol] : 200 ppm, 500 mg/m3
- [Acetaldehyde; Ethanal] : 200 ppm, 360 mg/m3

B. Engineering controls

- Business owner is recommended to maintain below recommended exposure limits for the working place with general exhaust of gas/vapour/mist/fume.

C. Individual protection measures, such as personal protective equipment

○ Respiratory protection

- Any air-purifying respirator with a full facepiece and an organic vapor canister.
- Any chemical cartridge respirator with a full facepiece and organic vaporcartridge(s).
- Any chemical cartridge respirator with organic vapor cartridge(s).
- Consider warning properties before use.
- For Unknown Concentration or Immediately Dangerous to Life or Health : Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.
- Respiratory protection is ranked in order from minimum to maximum.
- Under conditions of frequent use or heavy exposure, Respiratory protection may be needed.

○ Eye protection

- Provide an emergency eye wash station and quick drench shower in the immediate work area.
- Wear primary eye protection such as splash resistant safety goggles with a secondary protection face shield.

○ Hand protection

- Wear appropriate chemical resistant glove.

○ Skin protection

- Wear appropriate chemical resistant protective clothing.

○ **Others**

- Not available

9. PHYSICAL AND CHEMICAL PROPERTIES

A. Appearance	
- Appearance	Liquid
- Color	Colorless
B. Odor	Wine or whiskey smell
C. Odor threshold	10 ppm
D. pH	7(10g/L, H2O, 20°C)
E. Melting point/Freezing point	-114.1℃
F. Initial Boiling Point/Boiling Ranges	78.5 °C
G. Flash point	13℃
H. Evaporation rate	Not available
I. Flammability(solid, gas)	Not applicable (Flammable liquids)
J. Upper/Lower Flammability or explosive limits	27.7 / 3.1 %
K. Vapour pressure	5.8 kPa (20°C)
L. Solubility	789,000 mg/l (20℃)
M. Vapour density	1.6 (air=1)
N. Specific gravity(Relative density)	0.79475 (15°C/15°C)
O. Partition coefficient of n-octanol/water	-0.32 (Log Kow)
P. Autoignition temperature	400℃
Q. Decomposition temperature	Not available
R. Viscosity	1.074 cP (20°C, mPa s)
S. Molecular weight	46.07 g/mol

10. STABILITY AND REACTIVITY

A. Chemical Stability

- This material is stable under recommended storage and handling conditions.

B. Possibility of hazardous reactions

- Cylinders exposed to fire may vent and release flammable gas.

C. Conditions to avoid

- Avoid contact with incompatible materials and condition.
- Avoid: Heating, Flames and hot surfaces
- Avoid contact with heat, sparks, flame or other ignition sources.

D. Incompatible materials

- Not available

E. Hazardous decomposition products

- May emit flammable vapour if involved in fire.

11. TOXICOLOGICAL INFORMATION

A. Information on the likely routes of exposure

○ **Respiratory tracts**

- Not available

○ **Oral**

- Not available

○ **Eye·Skin**

- Not available

B. Delayed and immediate effects and also chronic effects from short and long term exposure

○ **Acute toxicity**

*** Oral**

- Product (ATEmix) : >5000mg/kg
- [Ethanol] : LD50 10470 mg/kg Rat (OECD TG 401, ECHA)
- [Methanol ; Methyl alcohol] : LD50 100 mg/kg Rat (NICS), EU harmonized Cat. 3 (ECHA)
- [2-Propanol] : LD50 5840 mg/kg Rat (OECD TG 401) (ECHA)
- [1-Propanol] : LD50 ca. 8000 mg/kg Rat (OECD TG 401, ECHA)
- [Acetaldehyde; Ethanal] : LD50 661 mg/kg Rat (NICS)
- [1,1-Diethoxyethane] : LD50 4600 mg/kg Rat (NLM, HSDB, ChemIDplus)
- [N-[2-(2,6-Dimethylphenyl)amino]-2-oxoethyl]-N,N-diethylbenzenemethanaminium benzoate] : LD50 584 mg/kg Rat(NLM)
- [Water] : LD50 > 90000 mg/kg Rat (LD50 > 90 ml/kg) (HSDB)

*** Dermal**

- Product (ATEmix) : >5000mg/kg
- [Methanol ; Methyl alcohol] : LD50 300 mg/kg Rabbit (NICS), EU harmonized Cat. 3 (ECHA)
- [2-Propanol] : LD50 12800 mg/kg (16.4 mL/kg) Rabbit (OECD TG 402) (ECHA)
- [1-Propanol] : LD50 4032 mg/kg Rabbit (OECD TG 402, ECHA)
- [1,1-Diethoxyethane] : LD50 10000 mg/kg rabbit (NLM, HSDB)

*** Inhalation**

- Product (ATEmix) : >50.0mg/L, Vapour, 4hr
- [Ethanol] : Vapor LC50 124.7 mg/L 4 hr Rat (OECD TG 403, ECHA)
- [Methanol ; Methyl alcohol] : Vapour LC50 3 mg/L 4hr Rat (NICS), EU harmonized Cat. 3 (ECHA)
- [2-Propanol] : Vapor LC50 > 30.1 mg/L 4 hr (>10000 ppm 6 hr) Rat (OECD TG 403, GLP) (ECHA)
- [1-Propanol] : Vapour LC50 > 33.8 mg/L 4hr Rat (OECD TG 403, GLP) (ECHA)
- [Acetaldehyde; Ethanal] : Vapour LC50 24.04 mg/L 4hr Rat (OECD TG 403)(ECHA)

○ **Skin corrosion/irritation**

- Not available

○ **Serious eye damage/irritation**

- Causes serious eye irritation

○ **Respiratory sensitization**

- Not available

○ **Skin sensitization**

- Not available

○ **Carcinogenicity**

*** IARC**

- [Ethanol] : Group 1(Limited to alcohol drinking)
- [2-Propanol] : Group 3
- [Acetaldehyde; Ethanal] : Group 1

*** OSHA**

- Not available

*** ACGIH**

- [Ethanol] : A3

- [Methanol ; Methyl alcohol] : Skin
- [2-Propanol] : A4
- [1-Propanol] : A4
- [Acetaldehyde; Ethanal] : A2

*** NTP**

- [Acetaldehyde; Ethanal] : R

*** EU CLP**

- [Acetaldehyde; Ethanal] : Carc. 1B

*** Other information**

- Not applicable

○ **Germ cell mutagenicity**

- Not available

○ **Reproductive toxicity**

- Not available

○ **STOT-single exposure**

- Not available

○ **STOT-repeated exposure**

- Not available

○ **Aspiration hazard**

- Not available

12. ECOLOGICAL INFORMATION

A. Ecotoxicity

○ **Fish**

- [Ethanol] : LC50 15.3 g/L 96 hr Pimephales promelas (US EPA method E03-05), NOEC 250 mg/L 120 hr Danio rerio (OECD TG 212) (ECHA)
- [Methanol ; Methyl alcohol] : LC50 15400 mg/L 96hr Lepomis macrochirus (EPA-660/3-75-009), NOEC 7900 mg/L 200hr Oryzias latipes (ECHA)
- [2-Propanol] : LC50 9640 mg/L 96 hr Pimephales promelas (ECHA)
- [1-Propanol] : LC50 4555 mg/L 96hr Pimephales promelas (OECD TG 203), NOEC > 11.58 mg/L 35d Danio rerio (OECD TG 210, GLP) (ECHA)
- [1,1-Diethoxyethane] : LC50 456.082 ㎎/ℓ 96 hr (Estimate)

○ **Crustaceans**

- [Ethanol] : LC50 5012 mg/L 48 hr Ceriodaphnia dubia (ASTM E729-80), NOEC 2 mg/L 10 d Ceriodaphnia dubia (ECHA)
- [Methanol ; Methyl alcohol] : LC50 18260 mg/L 96hr Daphnia magna (OECD TG 202) (ECHA)
- [1-Propanol] : EC50 3644 mg/L 48hr Daphnia magna (DIN 38412 Part 11, ECHA)
- [Acetaldehyde; Ethanal] : EC50 57.4 mg/L 48hr Daphnia magna (OECD TG 202,GLP)(ECHA)
- [1,1-Diethoxyethane] : EC50 228.664 ㎎/ℓ 48 hr Daphnia pulex (Estimate)

○ **Algae**

- [Ethanol] : EC50 275 mg/L 72 hr Chlorella vulgaris (OECD TG 201) (ECHA)
- [Methanol ; Methyl alcohol] : EC50 22000 mg/L 96hr Raphidocelis subcapitata (OECD TG 201) (ECHA)
- [1-Propanol] : EC50 9170 mg/L 48hr Raphidocelis subcapitata, NOEC 1150 mg/L 48hr Chlorella pyrenoidosa (ECHA)
- [Acetaldehyde; Ethanal] : EC50 > 100 mg/L 72hr Raphidocelis subcapitata (OECD TG 201,GLP)(ECHA)
- [1,1-Diethoxyethane] : EC50 76.850 ㎎/ℓ 96 hr (Estimate)

B. Persistence and degradability

○ **Persistence**

- [Ethanol] : log Pow -0.35 (24 °C, pH 7.4) (OECD TG 107, ECHA)
- [Methanol ; Methyl alcohol] : log Pow -0.77 (ECHA)
- [2-Propanol] : log Pow 0.05 (25 °C) (ECHA)
- [1-Propanol] : log Pow 0.2 (25℃, pH 7) (OECD TG 117, GLP) (ECHA)
- [Acetaldehyde; Ethanal] : log Pow 0.45 (25℃,pH7)(ECHA)

- [1,1-Diethoxyethane] : log Kow 0.84 (Estimate)
- [N-[2-(2,6-Dimethylphenyl)amino]-2-oxoethyl]-N,N-diethylbenzenemethanaminium benzoate] : log Kow 1.78 (NLM)
- [Water] : log Kow -1.38 (HSDB)

○ **Degradability**

- Not available

C. Bioaccumulative potential

○ **Bioaccumulative potential**

- [Methanol ; Methyl alcohol] : BCF < 10 (Leuciscus idus melanotus) (ECHA)
- [1,1-Diethoxyethane] : BCF 3.162 (NLM;HSDB)

○ **Biodegradation**

- [Ethanol] : Readily biodegradable, ca. 84 % degradation (O2 consumption) 20d (ECHA)
- [Methanol ; Methyl alcohol] : Readily biodegradable, 97 % degradation (O2 consumption) 20d (ECHA)
- [2-Propanol] : Readily biodegradable, BOD5/COD ratio ≥ 0.5 (EU Method C.5 and EU Method C.6) (ECHA)
- [1-Propanol] : Readily biodegradable, 75 % degradation (O2 consumption) 20d (ECHA)
- [Acetaldehyde; Ethanal] : Readily biodegradable, 93% degradation (TOC removal) 14day(OECD TG 301C)(ECHA)
- [1,1-Diethoxyethane] : Non-degradable; not degraded and has a high potential to accumulate in vivo (estimate)

D. Mobility in soil

- [Ethanol] : log Koc ca. 0.2 (ECHA)
- [Methanol ; Methyl alcohol] : Koc 0.13 ~ 0.61 (ECHA)
- [2-Propanol] : log Koc 0.03 (SIDS)

E. Other adverse effects

- Not available

13. DISPOSAL CONSIDERATIONS

A. Disposal methods

- It shall be treated by incineration
- Oil water separation technology shall be applied as pre-waste treatment if it is applicable
- Stabilization and minimization treatment by incineration or similar method can be applied, if more than two kinds of designated wastes are in mixture state and it is impractical to separate them
- Make sure to incinerate completely.

B. Special precautions for disposal

- Anyone with business license number who generates industrial wastes shall treat the waste by him/herself or by entrusting to the legal entities who treat the wastes, recycle the wastes of others or install and operate the waste treatment facilities according to the Wastes Control Act
- Dispose of waste in accordance with all applicable laws and regulations.

14. TRANSPORT INFORMATION

A. UN No. (IMDG CODE/IATA DGR)

- 1170

B. Proper shipping name

- ETHANOL (ETHYL ALCOHOL) or ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION)

C. Hazard Class

- 3

D. IMDG CODE/IATA DGR Packing group

- II

E. Marine pollutant

- Not applicable

F. Special precautions for user related to transport or transportation measures

- Local transport follows in accordance with Dangerous goods Safety Management Law.
- Package and transport follow in accordance with Department of Transportation (DOT) and other regulatory agency requirements.
- EmS FIRE SCHEDULE :F-E (Non-water-reactive flammable liquids)
- EmS SPILLAGE SCHEDULE :S-D (Flammable liquids)

15. REGULATORY INFORMATION

A. National and/or international regulatory information

○ **POPs Management Law**

- [Ethanol] : Not applicable
- [Methanol ; Methyl alcohol] : Not applicable
- [2-Propanol] : Not applicable
- [1-Propanol] : Not applicable
- [Acetaldehyde; Ethanal] : Not applicable
- [1,1-Diethoxyethane] : Not applicable
- [N-[2-(2,6-Dimethylphenyl)amino]-2-oxoethyl]-N,N-diethylbenzenemethanaminium benzoate] : Not applicable
- [Water] : Not applicable

○ **Information of EU Classification**

*** Classification**

- [Ethanol] : H225
- [Methanol ; Methyl alcohol] : H225,H301,H311,H331,H370
- [2-Propanol] : H225,H319,H336
- [1-Propanol] : H225,H318,H336
- [Acetaldehyde; Ethanal] : H224,H319,H335,H341,H350
- [1,1-Diethoxyethane] : H225,H315,H319

○ **U.S. Federal regulations**

*** OSHA PROCESS SAFETY (29CFR1910.119)**

- [Acetaldehyde; Ethanal] : 1133.9975 kg 2500 lb

*** CERCLA Section 103 (40CFR302.4)**

- [Methanol ; Methyl alcohol] : 2267.995 kg 5000 lb
- [Acetaldehyde; Ethanal] : 453.599 kg 1000 lb

*** EPCRA Section 302 (40CFR355.30)**

- Not applicable

*** EPCRA Section 304 (40CFR355.40)**

- Not applicable

*** EPCRA Section 313 (40CFR372.65)**

- [Methanol ; Methyl alcohol] : Applicable
- [2-Propanol] : Applicable
- [Acetaldehyde; Ethanal] : Applicable

○ **Rotterdam Convention listed ingredients**

- Not applicable

○ **Stockholm Convention listed ingredients**

- Not applicable

○ **Montreal Protocol listed ingredients**

- Not applicable

16. OTHER INFORMATION

A. Reference

- The information contained herein is believed to be accurate. It is provided independently of any sale of the product for purpose of hazard communication. It is not intended to constitute performance information concerning the product. No express warranty, or implied warranty of merchantability or fitness for a particular purpose is made with respect to the product or the information contained herein.
- This Safety Data Sheet was compiled with data and information from the following sources: KOSHA, NITE, ESIS, NLM, SIDS, IPCS

B. Issue date

- 2022-01-03

C. Revision number and Last date revised

- 2 times, 2026-08-21

D. Other

- This SDS is prepared according to the Globally Harmonized System (GHS).
- The information and recommendations in this safety data sheet are, to the best of our knowledge, accurate as of the date of issue. Nothing herein shall be deemed to create warranty, expressed or implied, and shall not establish a legally valid contractual relationship. It is the responsibility of the user to determine applicability of this information and the suitability of the material or product for any particular purpose
- This SDS is written for assisting buyers, handlers or the third party to manage materials. No express warranty, or implied warranty of merchantability or fitness for a particular purpose is made with respect to the product or the information contained herein. The recipient of our products is responsible for observing any laws and guidelines applicable.
- The content contained in this SDS may vary by country and region, and may not be consistent with the content of the actual relevant regulations. Buyer and handlers are responsible for identifying and complying with the relevant government and local regulations